

Serial No.: 10/644,567

PATENT APPLICATION

Docket No.: NC 84,613

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application.

1. (currently amended) A ~~large-area~~ plasma deposition system, comprising:
 - [[A.]] an electron beam source having a width much larger in dimension than its thickness and capable of sustaining an electron beam having an average electron energy of at least about 1 keV in the presence of 10 mTorr of oxygen;
 - ~~B. a plasma sheet produced by said electron beam passing through a gas; said plasma being a low electron temperature plasma sheet of pre-determined width, length, thickness, and location relative to a surface;~~
 - [[C.]] magnetic means for confining said beam to pass through a gas so as to produce a geometrically well defined, spatially uniform plasma sheet of pre-determined width, length, thickness, and location and having an electron temperature of about 1.5 eV or lower;
 - [[D.]] a target comprising source location for a material source for thin films or coatings; wherein the source location comprises one or more of a sputtering means and a vaporization means; and
 - [[E.]] a substrate location for a substrate upon which material sputtered or evaporated from said source target by said plasma is deposited as a thin film or coating.
2. (currently amended) The system according to claim 1, wherein the source location comprises the sputtering means and said source target is electrically biased above a sputtering threshold for said material source.
3. (original) The system according to claim 2, wherein said electrical bias is selected from DC or RF sources.
4. (original) The system according to claim 1, wherein said substrate is electrically biased.
5. (original) The system according to claim 4, wherein said electrical bias is selected from DC or RF sources.

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6. (currently amended) The system according to claim 1, wherein the relative position of said beam, plasma, source ~~target~~ and substrate is adjustable.
7. (currently amended) The system according to claim 1, wherein said ~~film or coating~~ material source is selected from the group consisting of metals, alloys, semiconductors or non-conducting materials.
8. (currently amended) The system according to claim 1, wherein said electron beam source is ~~selected from the group of sources consisting of~~ a linear hollow cathode beam source, ~~hot filament or field emitting electron source~~.
9. (original) The system according to claim 1, wherein said gas is selected from the group consisting of atomic or molecular gases or mixtures thereof.
10. (currently amended) The system according to claim 1, wherein both said source ~~target~~ and said substrate are electrically biased.
11. (canceled)
12. (currently amended) The ~~hybrid~~ system of claim 1 ~~claim 13~~, wherein said sputtering means is selected from the group consisting of magnetrons or ion beams.
13. (currently amended) The ~~hybrid~~ system of claim 1 ~~claim 14~~, wherein said vaporization means is selected from the group consisting of electron beams, lasers or thermal sources.
14. (currently amended) The ~~hybrid~~ system according to claim 1 ~~claim 13~~, wherein said ~~electron beam produced~~ plasma sheet is located between said source material and said substrate.
15. (new) The system according to claim 1, wherein the length and width of the plasma sheet are each at least about 60 cm.

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16. (new) A method of depositing a film comprising:
placing a material source and a substrate into an apparatus comprising:
an electron beam source having a width much larger in dimension than its
thickness and capable of sustaining an electron beam having an average
electron energy of at least about 1 keV in the presence of 10 mTorr of
oxygen;
magnetic means for confining said beam to pass through a gas so as to produce a
plasma sheet of pre-determined width, length, thickness, and location and
having an electron temperature of about 1.5 eV or lower;
a source location for the material source comprising one or more of sputtering
means and vaporization means; and
a substrate location for a substrate upon which material sputtered or evaporated
from said source is deposited;
placing a gas into the apparatus; and
activating the electron beam source.
17. (new) The method of claim 16, further comprising the step of:
electrically biasing the source above a sputtering threshold for said material source;
wherein the source location comprises the sputtering means.
18. (new) The method of claim 17, wherein said electrical bias is selected from DC or RF
sources.
19. (new) The method of claim 16, further comprising the step of:
electrically biasing the substrate
20. (new) The method of claim 19, wherein said electrical bias is selected from DC or RF
sources.
21. (new) The method of claim 19, further comprising the step of:
electrically biasing the source.